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DEVELOPING INFORMATION FOR ACADEMIC MANAGEMENT:

AN ALTERNATIVE TO COMPUTER-BASED SYSTEMS

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ABSTRACT

DEVELOPING INFORMATION FOR ACADEMIC MANAGEMENT:
AN ALTERNATIVE TO COMPUTER-BASED SYSTEMS

The need for management information by college and university administrators is becoming more intense. Recognizing that computerized information systems have not been able to satisfy this growing need, an alternative approach to the preparation of management information is described. This approach places the needs of decision makers before those of systems developers and outlines a process for the collection, evaluation, analysis, and interpretation of institutional data that should precede the implementation of computer-based information systems.

DEVELOPING INFORMATION FOR ACADEMIC MANAGEMENT: AN ALTERNATIVE TO COMPUTER-BASED SYSTEMS

College and university executive officers, deans, and department chairpersons need not be reminded of the challenges they face in maintaining vitality and creating change within academic organizations. Confronted with economic, political and social events that restrict the range of alternatives, institutional leaders have expressed the desire for information that is relevant to their decision-making and policy-formulation needs. Although their need for such information is not new, it is becoming more intense as a result of increasing demands to supply governing boards, legislative and administrative bodies, and other interest groups with answers to probing questions, justifications of resource requests, and disclosure of future plans. The apparent need for management information has resulted in numerous efforts to develop and install automated information systems. Unfortunately, too much emphasis by many college and university administrations seems to have been placed on keeping pace with the state of the art in the automated aspects of these systems, with little or no attention given to the information to be generated or its possible uses. Frequently, issues regarding data evaluation, collection, updating, reporting, and potential uses are ignored. These issues are especially important to those persons responsible for providing the information necessary for institutional management. Therefore, it is not uncommon for these persons to frequently disregard automated management reports in order to achieve optimum results.

To illustrate this point the application of automated processes to report data calls to mind the many efforts on the part of institutional per-

sonnel and those affiliated with public and private agencies to develop and implement computerized management information systems. These efforts were intended to employ automated systems to produce planning and management information purported to aid in information exchange among institutions and data reporting to external agencies. Such influences have led to the standardization of data elements and a search for implementation strategies applicable to users in a wide range of situations. This apporach is typified best by efforts of the National Center for Higher Education Management Systems (NCHEMS). Staff at NCHEMS have developed several planning and management tools and techniques which attempt to control for variations among educational organizations, as well as within individual institutions, by employing standardized data elements, definitions, and procedures. Theoretically, standardization of data inputs to an operational data base should serve as the foundation for the production of comparable analytic reports which provide information to institutional managers and external groups.

Unfortunately, only a relative handful of the nation's nearly twenty-five hundred colleges and universities are capable of standardizing the required data to support a management information system. In some cases the reasons for this inability to introduce and utilize a management information system are technical, that is institutions lack trained personnel and computer hardware to implement and maintain such a system. In other cases, organization and political alignments render the development and use of a management system improbable because of the degree of intra-organizational coordination and centralization required. Yet, despite the inabilities of many colleges and universities to produce it, the need for management information continues to increase.

Of those institutions that have standardized their data elements, developed automated information system and implemented analytic tools and techniques, many have experienced far fewer benefits than expected when measured against the manpower and financial costs or the resulting utility to decision makers. In some cases, the reasons for this high cost and low utility stems from the failure of high-level administrators to state clearly their needs for planning and management information and the potential uses to which such information could be put. In other cases, too much emphasis was placed on development of comprehensive data systems or the implementation of analytic tools for their own sake. For example, we have observed institutional personnel become so engrossed in attempts to follow an outside consultant's prescription of how to define, collect and format institutional data for computer consumption, that they lost complete sight of the meaning and value of the end product.

As administrators face complex problems, which are compounded by limited resources with which to implement solutions, they require information on a range of available policy options, their costs and the feasibility of alternative policies. Management information, ideally, should be created to provide knowledge of the essentials for rational decision making. In our view, management information is created by defining, collecting, evaluating, interrelating, analyzing, and interpreting data to assist decision makers address planning, organizing and controlling issues and problems. This concept of management information stresses that accuracy, reliability, timeliness and utility of the data which is, or should be, used in the decision making process takes precedence over the actual system used in collection,

storage and retrieval of data.

The variety of individuals and operational units responsible for the maintenance and reporting of disparate data elements within any but the smallest college or university usually makes the systematic collection, analysis, interpretation and dissemination of timely information to key executive and academic decision makers a difficult and exacting task. However, the problem is not insurmountable given an individual or organizational unit willing to accept responsibility for these crucial efforts. Essential to this undertaking is the realization that it is possible to collect, analyze and disseminate useful management information without resorting to a designated hardware/software system installed solely for that purpose. In fact, the methods of generating management information described in this paper should precede any decisions to develop and implement computerized information systems or analytic tools.

It is not the purpose of this paper to argue against the development of computerized information systems or the use of "packaged" analytic tools and techniques. Instead, this paper will describe a different approach to the creation of management information. Emphasis will be placed on data analysis, interpretation, evaluation and reporting of information relevant to policy and decision making.

The remainder of this article will describe how staff at the University of Utah overcame many of the operational and technical problems associated with computerized information systems and related analytical tools in order to develop a viable method for preparing and disseminating management information.

Planning and Budgeting Guide

The planning and budgeting processes provide instances where the availability of management information can influence decision making. Staff in the Academic and Financial Planning Office (AFPO) at the University of Utah sought, in January of 1975, to undertake production of a decision guide to be used by executive officers and deans for planning and budgeting. The document contained data that had been evaluated, analyzed, and interpreted in reference to timely policy issues and problems facing the University administration. The decision to produce a planning and budgeting guide "manually" represented a deliberate step back and a redirection of efforts away from the development of a systematized, computer based, comprehensive planning and management reports.[1] The following factors contributed to that decision:

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[1]It should be noted that the University of Utah has been committed to the development of computerized planning and management systems for some time. For example, Leo Kornfeld of Cresap, McCormick and Pagent, Inc. studied the University's management information system in 1969 and reported his findings in an article entitled "Advanced Applied Management Information Systems in Three Case Studies," in Minter, John, and Lawrence, Ben, eds. Management Information System: Their Development and Use in the Administration of Higher Education. Boulder, Colorado: Western Interstate Commission for Higher Education, (October 1969), pp. 85-88. In addition, a final report entitled Implementation of the WICHE Resource Requirement Prediction Model at the University of Utah was published by Burton M. Cohn, et.al., in March, 1972. More recently a final report entitled Comparison of the Effectiveness of Six Models in Forecasting Student Demand on Academic Departments was published by John Blake and Leon B. Robertson in June 1975. Currently the University is participating in the NCHEMS Information Exchange Procedures Project.

1. Issues and questions raised by University decision makers change and limit the utility of many computerized report generators.

2. Several attempts to standardize data elements, definitions, and reporting procedures among administrative support units of the institution have not been successful.

3. The ability to computerize operational data, integrate it, and prepare timely reports economically is not possible using contemporary techniques and software.

4. Preoccupation with trying to organize support and cooperation from administrative units for a planning and management system, coupled with the technical difficulties inherent in developing and implementing computer software packages left little time and energy for analysis and interpretation of management reports.

5. Because AFPO combines into a single organization the planning, budgeting, and institutional research capabilities of the institution, undertaking the production, by hand, of specific pieces of management information seemed both feasible and desirable from the perspective of developing and integrating the staff's joint capabilities.

Efforts during the second year (January, 1976) were concentrated on the further refinement of the document, titled the Resource Allocation and Planning Guide, by focusing on issues of immediate salience to executive officers and academic deans as well as longer-range planning issues. The specific purposes of the Guide were conceived as being fourfold:

1. To provide University decision makers with timely planning and management information.

2. To highlight significant trends in specified areas of University operation.

3. To focus attention on specific policy issues.

4. To provide a medium for educating administrators in the use of management information.

In contrast to a dynamic system, the Guide presents a static, cross-sectional picture of the institution. Despite the snapshot approach, the data contained in the document are subject to periodic revision, update and subsequent analysis throughout the year. A positive feature of this approach is the ease with which updates can be accomplished and the resulting timeliness of the data. For example, estimates of credit hour production can be replaced with actual figures and enrollment projections can be compared with subsequent experience. Additional analyses can be performed which respond to questions raised by users of the Guide. In this fashion information can be presented, in a form and at a time, with which management users are comfortable.

A subsidiary, but nonetheless important, purpose of the project was to promote discussion of key issues by administrators and to underscore important trends. It should be noted that the Resource Allocation and Planning Guide is not just another statistical summary. Its contents have been carefully selected and organized and the document held confidential for use by a small audience. In other words, the purpose of the Guide was to develop and present management information to key decision makers. By outlining the contents of the Guide and how it was produced, the authors hope to provide an outline or framework for others wishing to undertake similar projects.

Preparation of the Guide

Preparation of the Resource Allocation and Planning Guide began with the designation of an AFPO staff member as project manager working under the general direction of the AFPO assistant director responsible for coordinating University academic, financial, and facilities planning. This allo-

cation of staff time and talent represented a serious commitment to the project and to the estimated worth of its intended outcomes. This project team exercised responsibility for the contents of the Guide and for the analyses performed. Clerical assistance was utilized to perform the basic assignments of data-gathering, data-display and table preparation.

The major conceptual tasks centered around the identification of critical policy issues and how to influence the decision making process through the input of additional information organized and analyzed for that purpose. It was decided at the outset that the management information to be developed would illuminate and place in perspective the most salient policy issues as well as depict historical trends for several commonly accepted descriptions of academic units. Several sources provided insights into the most important issues: conversations with executive officers and deans, examination of documents and memoranda, and an examination of the general literature on higher education within the state and the nation. After identifying key policy issues, decisions were made regarding the data elements and display format appropriate to elucidating those issues and a conceptualization of the analyses required. It should be pointed out that AFPO staff exercised the right to include other data they deemed worthwhile to collect in anticipation of future issues arising.

Attention was also given to selecting potential management level users of the data as determined by their organizational roles. It was decided that the President and his executive staff, the Vice President for Academic Affairs, and the Vice President for Health Sciences would receive one version of the Guide having schools and colleges as the basic organizational

unit of analysis. A second version broke-down the college level aggregates into departmental summaries and was presented to deans. Several deans transmitted copies of the department data to their department chairpersons.

After selection of the appropriate audience, data elements and display formats, the data was collected, integrated, and analyzed. Sources of data included: Registrar's reports of enrollment, credit hours, and degrees conferred; budget and financial reports; instructional staff and AAUP salary summaries; instructional workload and other activity data. These data were collected from several institutional sources and put together by clerical and workstudy help under supervision of the project manager. Most of the compilation work involved transfer of data elements from standard reports (some computerized) and documents to the summary formats designed for the project. After the data were collected, the project team performed various analyses that were deemed relevant to the issues at hand and the interests of the intended users of the Guide. Analyses centered on alternative policies, the implications of each and estimate of their potential impact. Examples of the analyses performed include a study of course and section proliferation; faculty activity and workload; undergraduate improvement (i.e., effects of replacing teaching assistants with regular faculty); enrollment trends, projections and implications; among others.

The Guide was packaged in a looseleaf binder to facilitate additions, deletions and updates of the materials. The document was presented to recipients during meetings scheduled solely for that purpose and a general overview of and introduction to the contents of the Guide was given by the project director. These introductory sessions with executive officers, and

a parallel presentation to deans, stressed the uses of the information for management decision making related to academic planning and budget allocation. A good deal of effort was expended in attempting to educate the intended audience regarding the document's contents as well as to "sell" the recipient on its multiple uses, (e.g., planning, budgeting, data reporting for accreditation reviews, etc.).

Organization of the Guide

The organization of the Resource Allocation and Planning Guide was made simple by deliberate effort. The introductory section contained an overview of the major data elements contained in the Guide as well as interpretations of important trends. Suggestions for use of the data were presented in an effort to stimulate additional analyses by administrators. The data displays were linked to specific institutional issues. For example, historical and forecasted enrollment and credit hour data provided surrogates for student demand. These data were implicit determinants of budget allocation priorities. The data were related to workload and other issues regarding reallocation of faculty among organizational units. Another issue addressed was the University's commitment to a program of undergraduate improvement. Under this program the use of half-time teaching assistants was discouraged in favor of the utilization of regular full-time faculty. The Guide displayed data on changes in staffing patterns and in course and section enrollments associated with new staffing configurations.

A major section of the Guide was devoted to historical and projected student enrollments. These were not tied to specific policy issues, but the implications of these data for budget decisions seemed clear from the con-

text of the Guide itself. Appended to the Guide were historical expenditure profiles of each organizational unit depicting expenditures of budgeted general operating funds, various categories of soft money and total funds. Percentage changes were computed so that these could be compared to changes in University-wide averages. Another appendix included a summary of the then current outlook for graduates in each discipline which had been compiled by the Placement and Career Information Center of the University. The decision to include this last item of information was made because it was felt that several administrators would find it of interest and relevance to their own speculations about the employability of graduates. The use of an appendix makes it possible to include additional materials from external sources.

Perhaps the strongest hope for the utility of the Guide by executives and academic deans was the time at which it became available. The Guide was conceptualized as providing information for budgeting, as well as for college and department planning efforts. Executive level officers received copies of the Guide at approximately the same time that the state's higher education budget for the approaching year was announced. It was hoped that the high level of interest concerning determination of internal allocations would prompt use of the Guide. In a like manner, deans received their personal copy of the Guide as part of a hand-delivered package which contained, in addition, their unit's budget worksheets and total dollar allocation.

Several other potential uses of the Guide were envisioned beyond the budget cycle. The Guide contained many items pertinent to both internal program evaluations of colleges and departments as well as external accreditation procedures. Further, it placed in the hands of each college dean an array of information which could be referred to during the formulation of internal

policies and decisions. The important option also remained open for deans to share the information with department heads.

In sum, the preparation and dissemination of the Resource Allocation and Planning Guide allowed the AFPO staff to discover several important policy issues and to attempt to provide information on those issues to decision makers. The important learning experience for the AFPO staff came from the collection of data from disparate internal sources and from attempts integrate these various elements. Also, the experience provided the AFPO staff with a better understanding of its role and usefulness as a staff office. What emerged from these efforts was a greater understanding of the data itself, its reliability and comparability. Hopefully, the project resulted in the production of management information relevant to policy matters, that was developed using available data in their original form. Important to this undertaking was the commitment of staff time and effort, rather than the computer time which characterizes an on-line management information system.

The project manager who supervised preparation of the 1976 Guide received this as his first assignment as a new employee at the University. He spent approximately three-quarters time over a six week period supervising two student assistants and analyzing the data. By calling upon personnel in the Registrar's Office who prepare and report student and course information, budget analysts, and institutional research personnel, the project manager was able to obtain timely information and answers to his questions. In addition, these staff participated in the review of data displays once completed. This check and sign-off proved helpful in spotting problems attri-

butable to human or system errors, and to enhanced understanding of the data base among all parties.

Reflecting back over the process of preparing decision information, the following benefits have been derived:

1. Academic and Financial Planning staff interest in providing planning and management information provided a forum for discussion of issues and concerns with a variety of University decision makers.

2. AFPO staff were challenged to carefully consider data availability and utility, desplay formats, and analyses to be performed before plunging into the task of data collection.

3. Data collection and subsequent use provided an excellent means to critique the strengths and weaknesses of operational data bases.

4. Persons responsible for the collection and reporting of operational data were informed of how their data were being used to develop management information. Suggestions were made and some implemented regarding the improvement of these data bases.

5. Information included in the Guide was up-to-date.

6. Data analyses were issue-directed and simple to communicate and understand. Policy analysis was facilitated by the availability of relevant information.

7. AFPO staff developed rapport with University decision makers.

8. By distributing the Guide to Deans they were informed of the specific data used by executive officers in arriving at resource allocation decision for their units. This awareness permitted these administrators to begin resource negotiations from the same reference point.

In conclusion, it should be pointed out that the lessons learned when preparing the Resource Allocation and Planning Guide have caused AFPO staff to be critical when analyzing the data supplied in standard operating reports. Where these data are input directly to a computer-based information

system, one must be aware of potential problems concerning the validity and reliability of the system's output. The preparation by hand of reports for use by college and university administrators offers the distinct benefits that derive from "hands on" experience as listed above. The following recommendations are offered to those who would wish to follow the illustration presented here. They should, in addition, provide useful reminders for those persons or institutions who rely on computer based information systems as the source of management information.

Recommendations

1. There should be a constant monitoring of the sources of operational data as a check on the utility of such data for planning and management purposes.

2. Administrators should identify the issues and concerns they wish to be addressed before data is collected and analyzed.

3. The persons or offices where data is generated should be tapped as a source of expertise and insights into the quality and meaning of the data provided.

4. Sufficient time should be allowed for data analysis before reporting.

5. Procedures for information collection and update should be thoroughly documented so that tasks can be performed by clerical staff under supervision. This assures continuity of efforts and comparability of data.

6. Information should be disseminated as widely as organizational policy will permit. This will help to negate the need for colleges and departments to maintain separate records or hire analytical studies staff of their own.

7. Efforts to increase the number of organizational units covered should be made. For example, efforts are underway to develop and report planning and management information for use by the University Libraries, Student Services and Division of Continuing Education.

If institutional leaders are to cope with need for management information they must begin to influence the design and application of processes, tools and techniques employed by their institutions. To accomplish this college and university administrators are encouraged to consider each of the elements that comprise our concept of management information. Also, they must familiarize themselves with their institution's capabilities to generate information that meets these criteria. Without this thoughtful approach to the creation of information designed to aid decision makers in their planning, organizing and controlling we predict management information systems will continue to produce few benefits at increasingly greater costs.

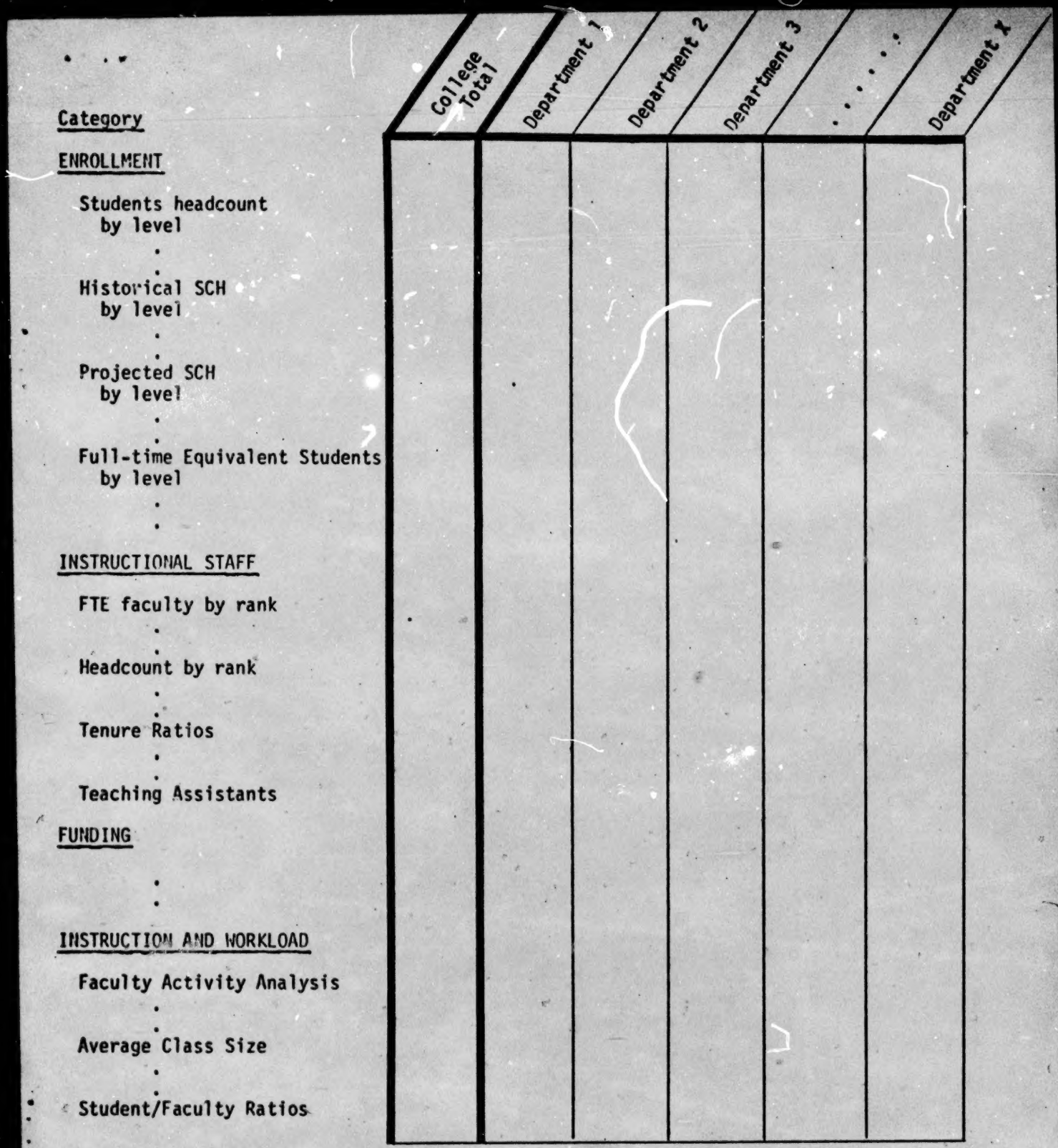

Figure 1
Example of data display used for Deans. Note that organizational units at top can be varied depending on audience.